



# **National Intrepid Center of Excellence**

**Cutting Edge Interdisciplinary Care for TBI & PH**

James Kelly, MD

Thomas DeGraba, MD

26 January 2011



Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE <b>26 JAN 2011</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2011 to 00-00-2011</b>	
4. TITLE AND SUBTITLE <b>National Intrepid Center of Excellence: Cutting Edge Interdisciplinary Care for TBI &amp; PH</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>Walter Reed National Military Medicine Center,8901 Rockville Pike,Bethesda,MD,20889</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES <b>presented at the 2011 Military Health System Conference, January 24-27, National Harbor, Maryland</b>					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>40</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			



# Intrepid Fallen Heroes Fund



- The Intrepid Fallen Heroes Fund (IFHF) continues the mission of helping US military service members and veterans begun in 1982 by Zachary and Elizabeth Fisher, the founders of the Fisher House Foundation and the Intrepid Sea-Air-Space Museum in New York Harbor
- The successful fundraising efforts of Arnold Fisher have generated philanthropic contributions to the IFHF for advanced medical facilities dedicated to military service members
- The Center for the Intrepid (CFI) opened at Brooke Army Medical Center in 2007 for amputation prostheses and functional limb loss care







# National Intrepid Center of Excellence



**Location:** NNMC campus, Bethesda, MD

**Lot Size:** ~3 AC

**Building Size:** ~72,000 SF

**Number of Stories:** 2

**Number of Personnel:** ~111

## Major Diagnostic / Rehabilitation Equipment:

- Magnetic Resonance Imaging (3-T) / Functional MRI / Diffusion Tensor Imaging
- Positron Emission Tomography with Computed Tomography (PET/CT)
- Magneto encephalography (MEG) Scanner
- Trans-Cranial Doppler Ultrasound
- Fluoroscopy
- CAREN (Computer Assisted Rehabilitation Environment) system





# NICoE Vision & Mission

**Vision:** The NICoE is an instrument of Hope, Healing, Discovery, and Learning

**Mission:** To be the leader in advancing world-class psychological health and traumatic brain injury treatment, research, and education

## Key Principles:

- A model of interdisciplinary diagnostic and treatment planning in a family focused, collaborative environment which promotes physical, psychological and spiritual healing
- A research hub with a unique patient base and the most current technical and clinical resources for initiating innovative pilot studies designed to advance evaluation and treatment in warriors with the complex interaction of TBI and PH and who are not responding to conventional therapy elsewhere in the MHS
- An education and training venue for the dissemination of next generation standards of care and resilience to providers as well as Service Members and families
- An innovative platform committed to long-term Warrior follow-up and family contact



# NICoE within the DoD

---



The NICoE is a “Game Changer” for the DoD’s TBI and PH capability

- A premier institute for holistic healthcare dedicated to research, diagnosis, and treatment of military personnel and veterans suffering from Traumatic Brain Injury (TBI) and Psychological Health (PH) conditions.
- A team, nested under a military COC, which incorporates renown civilian and military clinical prowess in areas of research, patient treatment, and collaboration.
- A collaborative and innovative DOD center of gravity for TBI/PH Research and Education; the NICoE leverages the best progressive research and advancement throughout the academic, private and military sectors.
- One of the world’s most aesthetically designed buildings, the NICoE is leveraged as a signal of hope and commitment to all who walk through its doors.



# NICoE Research

---

- NICoE's research goals are focused on:
  - Serving as a **collaborative research hub** by leveraging advanced technical and clinical resources and providing an environment for sharing information across military, federal, academic and industry partners. **Subject Matter Expert symposia to discuss research.**
  - **Designing and implementing pilot studies** which advance novel diagnostic and treatment strategies of TBI and PH conditions.
  - **Establishing a robust research database** and specimen repository for advanced bio-informatic analysis by military and civilian academic and industry research partners.
  - **Research Protocols** – Cooperation with DoD Research Profile.
- NICoE's planned collaborations include the Department of Veterans Affairs, Defense Centers of Excellence, Uniformed Services University of the Health Sciences, National Institutes of Health, Walter Reed Army Medical Center, National Naval Medical Center and academic centers.



# Research Projects

---

- NICOE will serve as a research hub, contributing significantly through the development of a Common Data Elements Database (CDE dB) for TBI and PH (See slide 36 for further details of Research Data Registry)
- The NICOE will review promising innovations and technologies in the diagnosis and treatment of TBI and PH conditions and develop pilot research projects
- Established relationship with NNMC IRB process
- Initial research protocols:
  - National Capital Consortium TBI Neuroimaging Core Project (325 Subjects)
  - HBO<sub>2</sub> research protocol
- Protocols currently under development:
  - Virtual Reality research protocols for innovative assessments of TBI and PH conditions





# Research Projects

---



- All patients accepted to the NICoE will be offered an opportunity to participate in research protocols once at the Center
- Willingness to participate in research will NOT influence acceptance to the Center nor alter the clinical care delivery.
- Research protocols that encompasses the spectrum of TBI and PH disorders will be engaged at the NICoE and will recruit from populations in addition to and/or outside those accepted for the two to three week intensive evaluation, treatment and long term treatment planning.
- Description of protocols being engaged at the NICoE and in collaboration at other sites will be listed on the NICoE Website (Currently under development)



# Training and Education

---

- NICOE's Training and Education (T&E) mission is to serve as:
  - An education catalyst for stimulating research and discovery
  - An agent for advancing clinical practices
  - A platform for disseminating the next generation of standards of care for patients with complex TBI and PH to providers, service members and their families
- T&E at the NICOE is based on four key components:
  - Warrior, Family, and Leader Education Resources
  - Interprofessional Staff Development
  - Continuing Health Professions Education
  - Student, Resident and Fellow Education



# NICoE Roundtable – 29 Oct 2010



- In keeping with the NICoE Mission, the Training and Education Directorate hosted the “Area Health Education Center Roundtable” on 29 October 2010, including representatives from the following organizations:
  - Defense Centers of Excellence (DCoE)
  - DCoE TBI Education Collaboration
  - National Center for Telehealth and Technology (T2)
  - Department of Veterans Affairs (VA)
  - Area Health Education Centers (AHEC)
  - VA Medical Center (VAMC), Salisbury, NC
  - Deployment Health Clinical Center (DHCC)
  - National Guard Bureau, J-1
  - Brain Injury Association of America
  - Center of Excellence for Remote and Medically Under-Served Areas (CERMUSA)
  - BrainLine.org (WETA/PBS)
  - Health Resources and Services Administration (HRSA)
  - Defense and Veterans Brain Injury Center (DVBIC)
  - Uniformed Services University of the Health Sciences (USUHS)
  - Headquarters Air Force (A9L)
  - University of California, San Francisco (UCSF) at Fresno
  - John A. Burns School of Medicine (JABSOM), University of Hawaii at Manoa
  - Mountain Area Health Education Center (MAHEC), University of Maryland at Baltimore
  - University of Minnesota
  - Oklahoma State University Center for Health Sciences
  - Virginia Commonwealth University
  - University of Massachusetts Medical School
  - University of Texas Medical Branch
  - Medical University of South Carolina



# Outreach / Network

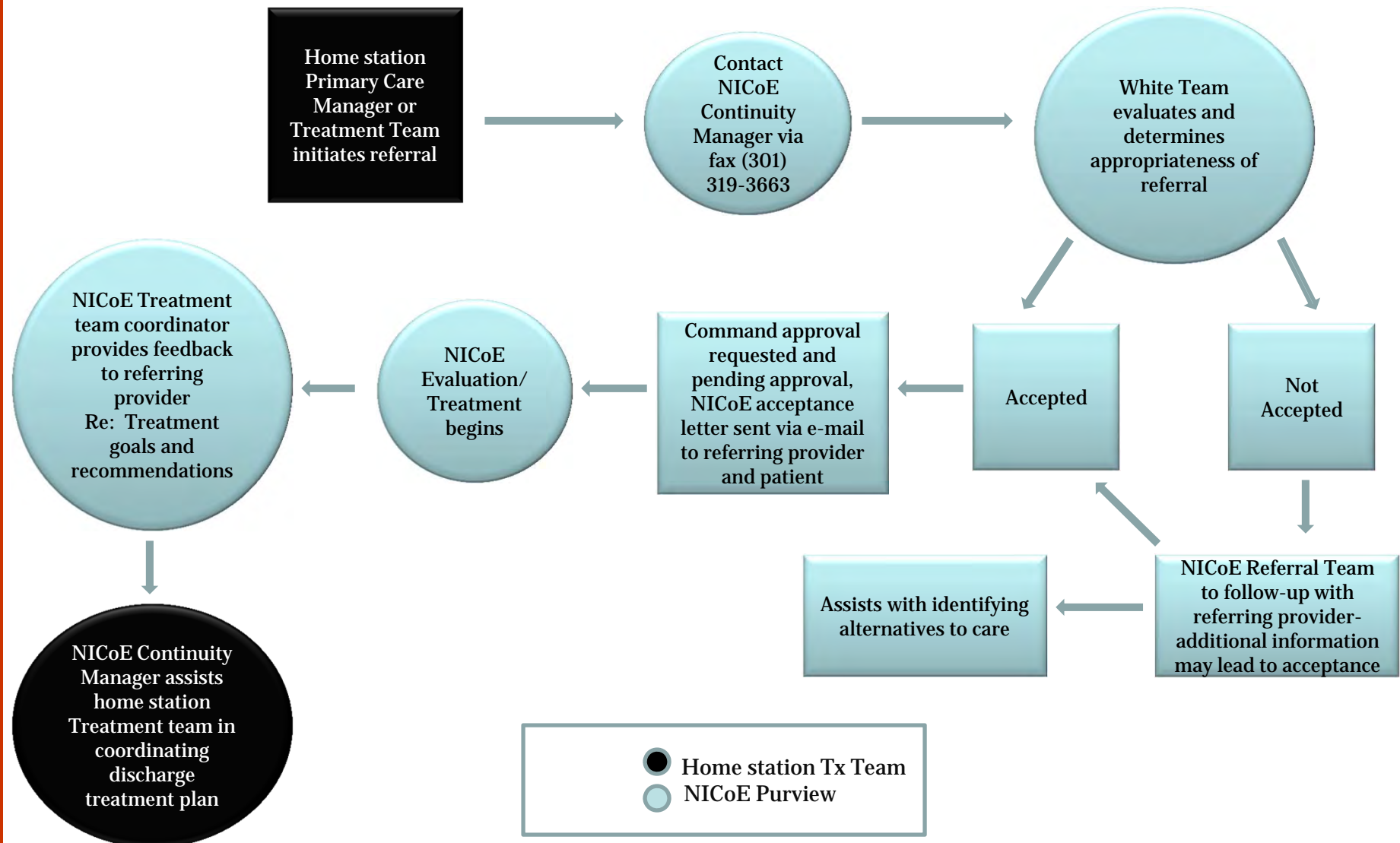
- A NICOE Network will be a virtual or physical connection to Military Treatment Facilities and major military clinics engaged in the care of wounded Warriors with PH / TBI issues. The Network will enable sharing of health data, clinical diagnostic and treatment protocols, outcome assessment measures and best practices
- Projected capabilities of NICOE networks include:
  - Extension of treatment capabilities and clinical practice guidelines
  - Liaison personnel and workspace
    - Free standing
    - Incorporated in another facility
  - Key to operationalizing and maintaining a “string” to post-NICOE patients
- A web of networks will elevate and expand the quality of care for PH / TBI and establish standards for future clinical, research and educational projects through the rapid and timely exchange of information





# NICoE Referral Process

(Current referral through Fax; Web based portal in development)





# NICoE Spirit of Hospitality



## Continuity Support Services/Continuity Manager Unique Roles:

- *Initial contact* with the referring source
- Inclusion criteria evaluated with Medical and Research members
- *Personal referral process* for those not meeting inclusion criteria
- Medical record and imaging studies obtained and assembled
- Present Warrior and Family records to medical screening team
- *Contact Family* – initiate invitation and travel process
- Participate in the initial on site interview with evaluation and treatment planning team
- *“Warm”Hand off* to Family Agenda Coordinator
- Re-engage at the treatment planning phase
- *Begin the continuity treatment planning* with Warrior’s home provider and case managers
- Life long follow up



# Provider Referral Form



## National Intrepid Center of Excellence (NICoE) Patient Referral Form

Referral Source			
Referring Provider:		Date of Referral:	
Provider Phone:	Provider Email:	Department/Clinic:	
Phone: <input type="checkbox"/> Home <input type="checkbox"/> Cell <input type="checkbox"/> Work	Facility Name/Location:	Reason for Referral/Anticipated Goal:	
Alt Phone: <input type="checkbox"/> Home <input type="checkbox"/> Cell <input type="checkbox"/> Work			
Patient Information			
Last Name:	First Name:	Middle Initial:	Rank:
Last four of SSN:		Approx. Time In Service:	
MOS/AOC/Raw (Job Title):		Name & Location of Command:	
Branch of Service: <input type="checkbox"/> Army <input type="checkbox"/> Navy <input type="checkbox"/> Air Force <input type="checkbox"/> Marines <input type="checkbox"/> Coast Guard		Approximate # of Deployments: <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2-3 <input type="checkbox"/> 4 or more	
Patient Contact Information:		Current Unit Commander:	
Name:		Name:	
Phone: <input type="checkbox"/> Home <input type="checkbox"/> Cell <input type="checkbox"/> Work		Phone: <input type="checkbox"/> Home <input type="checkbox"/> Cell <input type="checkbox"/> Work	
Alt Phone: <input type="checkbox"/> Home <input type="checkbox"/> Cell <input type="checkbox"/> Work		Alt Phone: <input type="checkbox"/> Home <input type="checkbox"/> Cell <input type="checkbox"/> Work	
E-Mail:		E-Mail:	
Family/Support System:		Social Stressors:	
<input type="checkbox"/> Spouse <input type="checkbox"/> Parents <input type="checkbox"/> Significant Other <input type="checkbox"/> Extended Family <input type="checkbox"/> Friends <input type="checkbox"/> Children <input type="checkbox"/> Supportive Command			
Date of Birth: (DD/MM/YYYY)	Age:	Gender: <input type="checkbox"/> Male <input type="checkbox"/> Female	Marital Status: <input type="checkbox"/> Single <input type="checkbox"/> Married <input type="checkbox"/> Separated <input type="checkbox"/> Divorced <input type="checkbox"/> Widowed
Traumatic Brain Injury:		Psychiatric Dx:	
<input type="checkbox"/> Mild/Concussion <input type="checkbox"/> Moderate <input type="checkbox"/> Severe		<input type="checkbox"/> Depression <input type="checkbox"/> PTSD <input type="checkbox"/> Anxiety <input type="checkbox"/> Other _____	
Approximate Time of Injury:		Treatment History:	
<input type="checkbox"/> < 3 months ago <input type="checkbox"/> 3 - 6 months ago <input type="checkbox"/> 6 - 12 months ago <input type="checkbox"/> > 12 months ago		<input type="checkbox"/> Individual Therapy <input type="checkbox"/> Pain Management <input type="checkbox"/> Group Therapy <input type="checkbox"/> Sleep Education <input type="checkbox"/> Medical Management <input type="checkbox"/> OT/PT <input type="checkbox"/> Cognitive Rehab <input type="checkbox"/> Vestibular Rehab <input type="checkbox"/> Speech/Language Therapy <input type="checkbox"/> Other _____	
Injury - Event:		Comorbid Medical Conditions:	
<input type="checkbox"/> Fall <input type="checkbox"/> Crash <input type="checkbox"/> Blast (e.g., IED, mortar, rocket, etc) <input type="checkbox"/> Other blow to the head		<input type="checkbox"/> Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/> Excellent	
Current Symptoms:		Current Medications (Names Only):	
<input type="checkbox"/> Headaches <input type="checkbox"/> Sleep Difficulties <input type="checkbox"/> Dizziness <input type="checkbox"/> Irritability <input type="checkbox"/> Blurry vision <input type="checkbox"/> Ringing in ears		<input type="checkbox"/> Balance problems <input type="checkbox"/> Sensitive to light/noise <input type="checkbox"/> Memory problems <input type="checkbox"/> Poor concentration <input type="checkbox"/> Poor work functioning <input type="checkbox"/> Emotional symptoms	
Fitness for Duty Status:		Potential for Active Duty Retention:	
<input type="checkbox"/> Fit for Duty <input type="checkbox"/> Limited Duty or Profile <input type="checkbox"/> Medical Board		<input type="checkbox"/> Very Likely <input type="checkbox"/> Likely <input type="checkbox"/> Unlikely <input type="checkbox"/> Very Unlikely	
Legal Status:		Military Status:	
<input type="checkbox"/> Disciplinary action pending <input type="checkbox"/> Legal action pending <input type="checkbox"/> Litigation issues		<input type="checkbox"/> Motivated for continued service <input type="checkbox"/> Has at least 6 months of obligated service	
Clinical Issues:			
<input type="checkbox"/> Non-ambulatory <input type="checkbox"/> Severe pain <input type="checkbox"/> Past suicidal/homicidal behavior <input type="checkbox"/> Recent suicidal/homicidal thoughts <input type="checkbox"/> Disinhibited/inappropriate <input type="checkbox"/> Prescription medication misuse <input type="checkbox"/> Excessive alcohol use <input type="checkbox"/> Illicit drug abuse <input type="checkbox"/> Domestic violence <input type="checkbox"/> Assaultive/violent <input type="checkbox"/> Impulsive			
Provider Signature: _____			



# NICoE Employment Opportunities

---



- 111 Personnel when fully staffed
  - 43 Currently On-Board
    - 15 Uniformed Staff On-Board
    - 28 Civilian Staff On-Board
- Still recruiting for a variety of civilian positions
  - For information on opportunities, please contact us at [NICoE@med.navy.mil](mailto:NICoE@med.navy.mil)





# Summary

## 22 Nov "Tank" Brief

---



### **NICoE will change lives by:**

- Leveraging clinical protocol research with scientific rigor applying traction from recruiting to training to combat to post-discharge.
- Serving as an epicenter of collaboration and symposia by harnessing the **unique** and collective issues of wartime TBI/PTS/PH in concert with other world class COE's.
- Creating a one-stop referral cell for WII's to optimize capacity, availability, and applicability of other COE's; (e.g., Rehabilitation Institute of Chicago, UCLA, Cleveland Clinic, University of Pittsburgh Medical Center, etc.).

***America's shock trauma care has improved as a result of combat and wartime DoD experience . The NICoE will become an epicenter of research and collaboration also elevating care and outcomes in TBI/PH conditions among Warriors and all our citizens. We will change lives.***



# Medical Imperative

---



- Excess of 300,000 warriors with TBI and/or PH disturbances.
- Complex interaction between TBI and PHI resulting in new clinical entity or more virulent form of TBI and PH issues.
- Failure of recovery despite conventional therapy
- Challenge: Identify Pathophysiology, Natural Hx, Diagnostic Tools, Treatment & Disseminate information







# IED: Improvised Explosive Device







# NICoE Charge

(To address mission of Clinical Care, Research and Education)

NICoE

- Effective Clinical Model
- Sustainability of Treatment Plan
- Expanded Knowledge of TBI/PH
- Dissemination and Impact of Clinical Model and Treatments



# Patient Profile

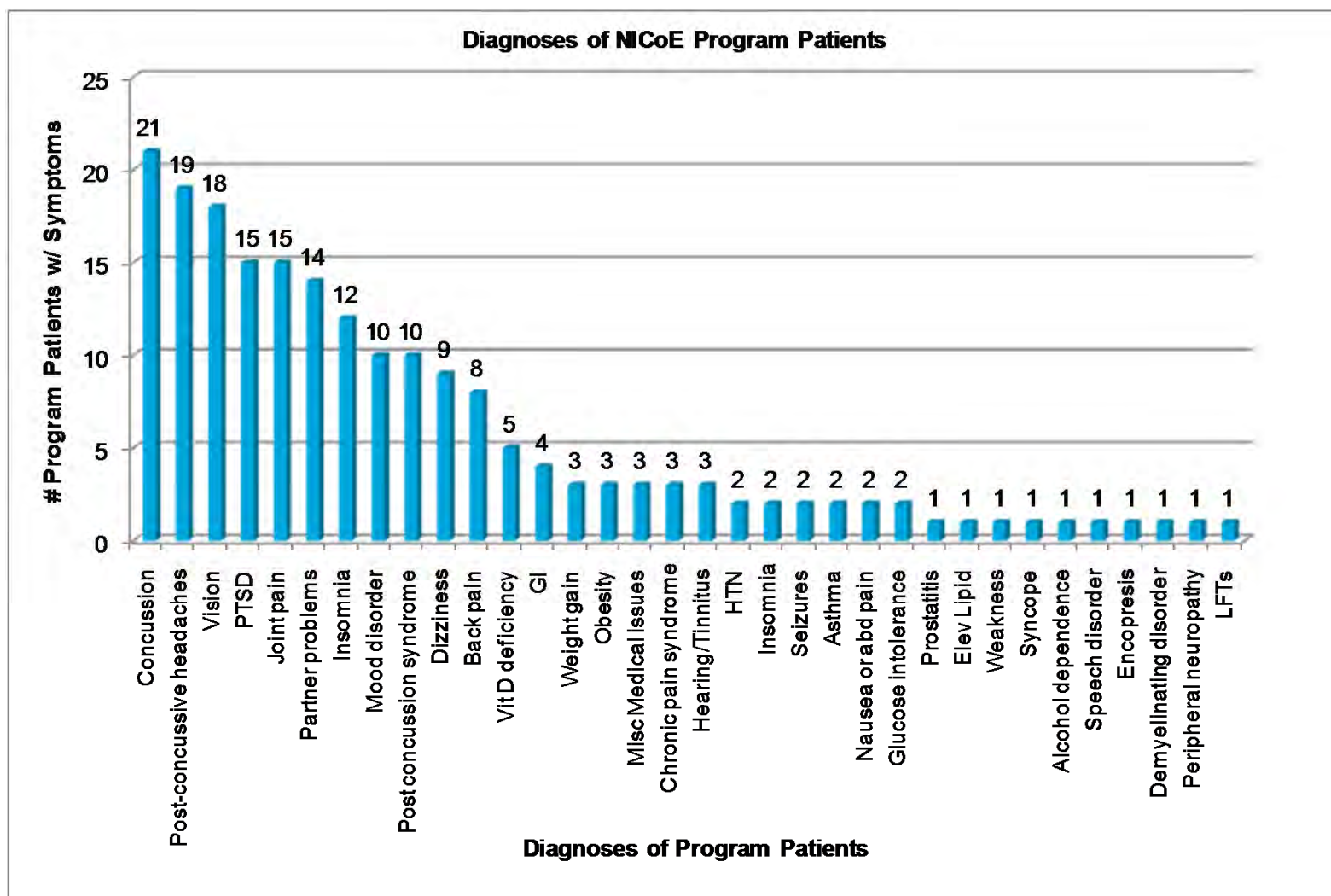
---

- Active duty service members with TBI complicated by other impairing PH conditions, who are not responding to conventional therapy and who have been unable to return to full duty & interpersonal relationships
- The primary profile of service members who will be seen at the NICoE will include:
  - Active Duty
  - Mild to moderate TBI and PH (OEF/OIF/OND related)
  - Persistence of symptoms despite "defined" treatment
  - No active/untreated substance abuse disorder (no potential for withdrawal)
  - Capable of participating in an Intensive Outpatient Level of Care, including:
    - Not a danger to self or others
    - Not in need of services requiring a level of nursing care or medical monitoring higher than what can safely be provided in an outpatient setting



# NICoE Patient Statistics

(Initial 21 Warriors – 903 encounters: 2010)





# Holistic approach

---



“It is much more important to know what sort of a patient has a disease than what sort of a disease a patient has.”

-William Osler





# Optimal Healing Environment



Interdisciplinary, Integrative, Holistic & Family Based Care

## **Patient Intake Factors**

Poor Military Performance  
Fractured Interpersonal  
Relations  
Reliance on Substances  
Physical & mental Pain  
Lack of Empowerment

## **NICoE Goals**

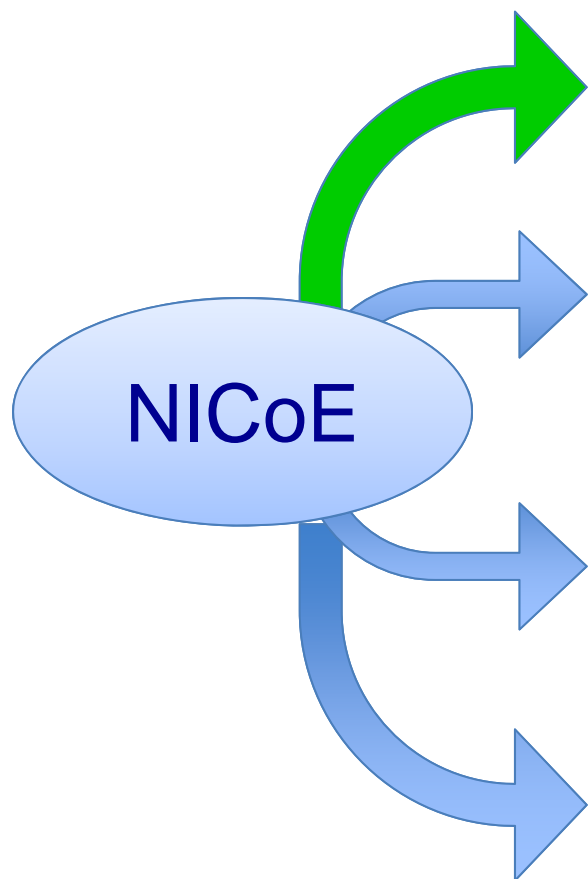
Reduce Impairment  
Reduce Disability  
Reduce Suffering  
Instill Hope

## **Trajectory of Recovery**

Enhanced & Motivated  
Performance  
Recovering Interpersonal  
Relations  
Use of Mind/Body Skills  
Reduction in Pain  
Self management



# NICoE Charge



- Effective Clinical Model
- Sustainability of Treatment Plan
- Expanded Knowledge of TBI/PH
- Dissemination and Impact of Clinical Model and Treatments



# Multidisciplinary vs Interdisciplinary

---

## **Multidisciplinary**

- Each discipline approaching from own perspective
- Treatment Prescribed to Patient
- Systems based care model
- Patient recipient of plan

## **Interdisciplinary**

- Integrates separate discipline approaches
- Patient intimately involved in discussions and planning
- Holistic
- Pt empowered to have responsibility in their care



# Interdisciplinary Clinical Care Paradigm Overview

---



- Interdisciplinary Team interview (Day One)
  - Internist, Neuro/Sleep, Psych, Neuropsych, Family Therapy, Chaplain
- First Four days - initial extensive evaluation
- Trajectory of Recovery: An objectives document addressing defined problems, signed by patient and providers
- Extended work-up and initiation trials of integrated treatment modalities over the next two weeks
- Discharge Summary (24 hours prior to d/c)  
Warrior/Family and Team meeting



# Evaluations

---

## NICoE Clinical Evaluations include:

Daily morning & afternoon teaming rounds

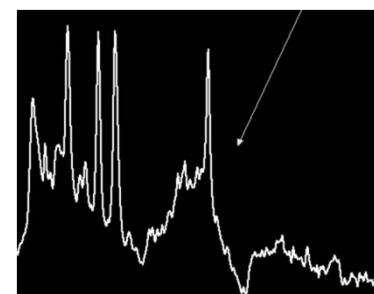
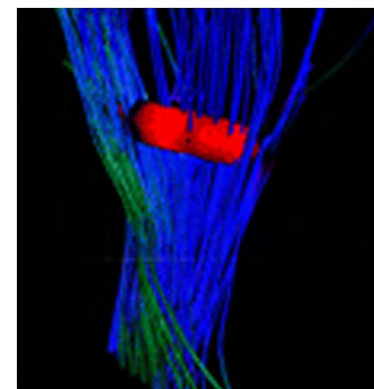
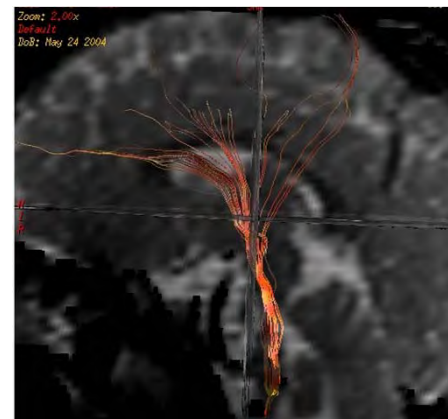
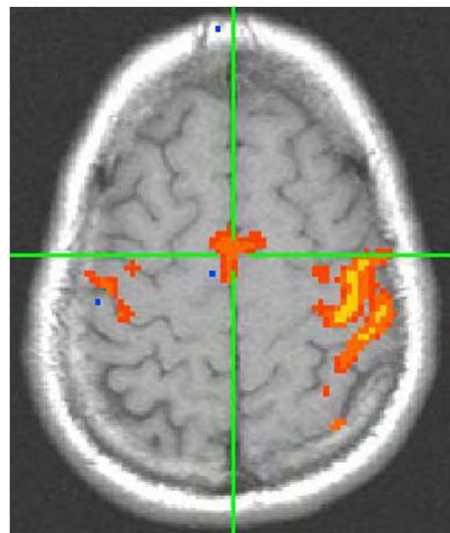
- Physical / Neurological Examination
- Psychiatric / Psychological Health Evaluation
- Physical Rehabilitation Evaluation
- Vestibular / Audiology / Speech Assessment
- Neuro-Ophthalmology Testing
- Electrophysiology (including Sleep Evaluation)
- Clinical Pharmacy Evaluation
- PM&R/OT/PT assessments
- Family Evaluations
- Vocational Testing/Screening
- Neuroimaging Evaluation
- Complementary and Alternative Medicine (CAM)
- Assistive Technology Lab
- Virtual Reality Diagnostic Assessment
- Nutritional Evaluation
- Substance Use Assessment
- Spirituality Consultation





# Comprehensive Neuro-Imaging

- Brain Structure
- Brain Lesions
- Brain Function
- Brain Chemistry
- White matter ultrastructure
  - Axonal fiber tracks
- Brain Perfusion





## Interdisciplinary Team Directed Trial Therapies

(Examples of potential therapies engaged to define patient response)



- Neurocognitive rehabilitation
- Psychiatric Care/PTSD/PHI: including Exposure Therapy, Cognitive Processing Therapy, Anxiety Management, Imagery
- Neurological Tx: Sleep studies, Headache management
- Vestibular & physical therapy training
- Autogenic Training: Heart Math
- Pain Control: Acupuncture, Relaxation
- Family Therapy: FOCUS
- Wellness: Yoga, Nutrition, Rec, Art & Music Therapy

***A Paradigm of exposure to multiple modalities  
to assess benefit: Patient Centric***



# Observations from 24 patients

---



- Many individuals with vague vestibular complaints have previously undiagnosed convergence issues.
- Significant contributor of post concussive headaches is myofascial pain which has been commonly relieved by acupuncture
- Psychological resistance and commonly observed defeatist attitude is often diminished with interdisciplinary approach and calming milieu
- Actigraphy and sleep diary/assessment early in the program allows for modification of sleep architecture
- Overwhelming number of patients respond to non-pharmacologic autonomic regulation (Heart Math, Mind Body Skills, acupuncture, Yoga)



# “Warm Hand-Off” to Primary Team

---



- Interdisciplinary Team Meeting with Service Member and Family Prior to Discharge to Discuss recommendations
- To assure implementation and transfer of recommended plan at home MTF, NICoE will engage a 4 tier communication network.
- 

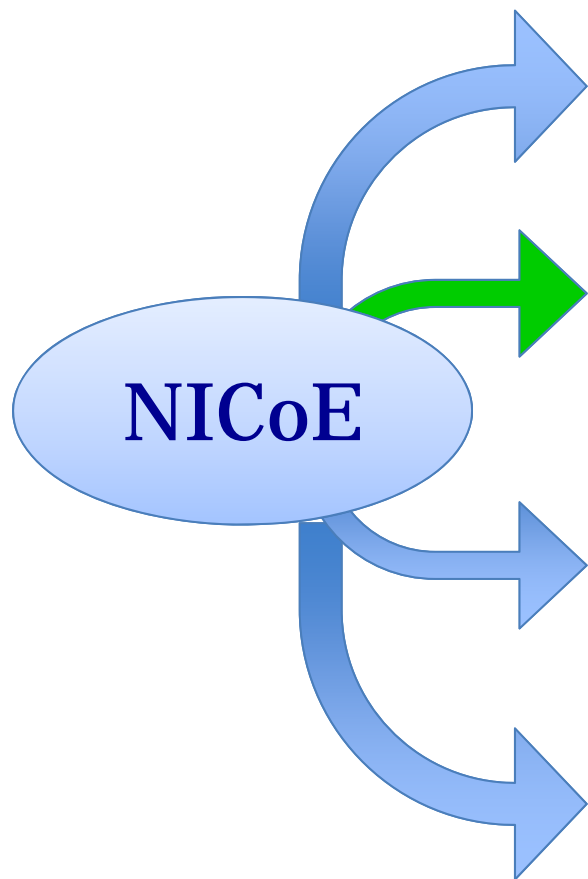
## Communication Network

- Provider to Provider : Review Discharge Summary and Plan
- Continuity Manager to Case Manager : Assure resource availability
- NICoE Administration to Command : Assure “buy-in” to support recovery plan
- NICoE Long Term F/u : Continued consultative & Telehealth Support





# NICoE Charge



- Effective Clinical Model
- Sustainability of Treatment Plan
- Expanded Knowledge of TBI/PH
- Dissemination and Impact of Clinical Model and Treatments



# Case Reports...

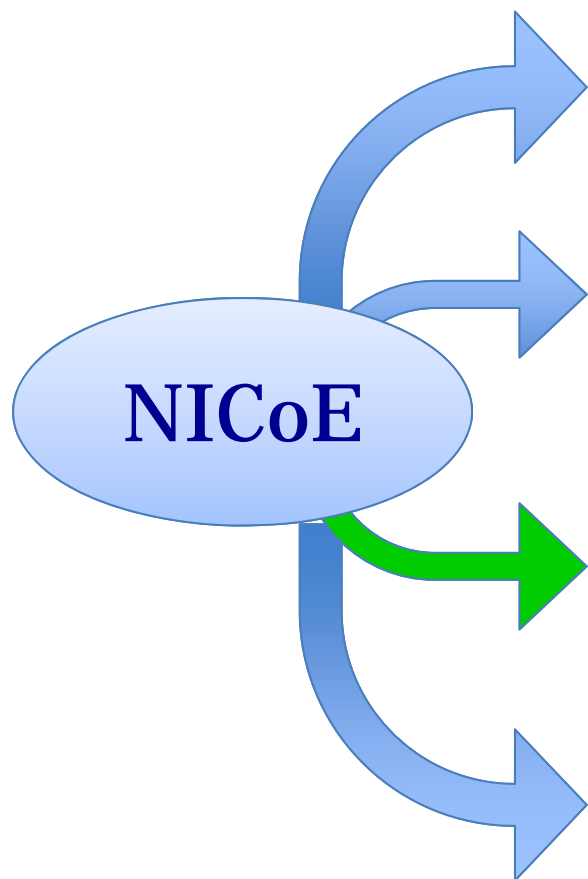
---



“



# NICoE Charge



- Effectiveof Clinical Model
- Sustainability of Treatment Plan
- Expanded Knowledge of TBI/PH
- Dissemination and Impact of Clinical Model and Treatments



# Research: Data Registry

Platform to de-identify all clinical data from robust evaluation, treatment and outcomes

---



- Identify complex patterns of the injury state
- Develop Collection Platform for granular capture of clinical data elements: Including Anatomical (imaging), Biochemical (PET, biomarkers, genomics, etc), Physiological, Behavioral, Spiritual & Family assessment (De-identified data base requires participant consent)
- Provide longitudinal data for Dx, Tx and Outcome.
- Common Data Elements: Quad Agency Initiative to develop common dictionary to enhance collaboration and merging of data sets.

***(Willingness to participate in research will NOT impact acceptance to the NCoE nor clinical care delivery)***





# Virtual Iraq



## Technology Enhanced Treatment Paradigms





# NICoE Charge

NICoE

- Effective Clinical Model
- Sustainability of Treatment Plan
- Expanded Knowledge of TBI/PH
- Dissemination and Impact of Clinical Model and Treatments



# Metrics of Efficacy

(Examples of short and long term outcomes)

---



- Global Outcome Measures:  
RTD, Employment, Marital/social engagement, Substance use, SF-36, Success in treatment plan implementation
- Objective Specific: Cognitive Testing, Pain control (Headache: HITS), Psychiatric (PCL, BDI, PHQ), Sleep Inventory, etc.
- MHS Benefit: Impact of Distributive Services
- Care for the health care provider



# Questions